

1 CAULKING TUBE SEALING CAP

2
3 FIELD OF THE INVENTION

4 The instant invention relates generally to containers
5 useful for dispensing sealants, glues or other viscous
6 materials; particularly to caulking guns and tube containers,
7 and most particularly to a caulking tube sealing cap
8 constructed and arranged to cooperate with a caulking tube tip
9 to prevent air from entering the tube when the cap is in
10 operation.

11
12 BACKGROUND OF THE INVENTION

13 Viscous construction materials such as adhesives, fillers,
14 patching materials, caulking and other sealants are
15 inefficiently utilized without proper packaging. Such
16 construction materials are generally packaged into tubes or
17 cartridges made of cardboard or plastics. These tubes or
18 cartridges include an integral tapered nozzle usually made of
19 plastics or metals. Before use, these tubes are loaded into a
20 tool referred to as a caulking gun which enables neat and
21 efficient dispensation of the construction materials contained
22 within the tube. The caulking gun user clips the tip end of
23 the nozzle and perforates the internal membrane in order to
24 create an opening for extrusion of the material in a thin

1 ribbon onto a desired surface.

2 Frequently, one project does not require use of the entire
3 contents of a caulking tube. When the partially filled tube is
4 stored for future use, the remaining contents are often exposed
5 to air and as a result dry out and harden. The material in the
6 dispensing nozzle is particularly vulnerable to hardening upon
7 air exposure. A tube having a nozzle blocked by hardened
8 material will no longer function to neatly deliver material.
9 The tubes are often broken in attempts to gain access to the
10 remaining material therein. Thus, partially filled tubes are
11 frequently discarded and the remaining usable material wasted.
12 The waste of materials typically increases the cost of already
13 expensive construction projects.

14 Many attempts have been made to avoid hardening of left
15 over materials and thus avoid waste by blocking the orifice in
16 the opened nozzle with nails, screws, wire nuts and/or tape.
17 Only limited success has been achieved because such attempts
18 failed to completely block the passage of air into the opened
19 tubes.

20 There remains a need in the art for an efficient, easy-to-
21 operate cap or seal capable of completely preventing air from
22 entering a caulking tube and thereby extending the shelf-life
23 of the material remaining in the tube.

24

1 DESCRIPTION OF THE PRIOR ART

2 Many attempts have been made to improve the dispensation
3 of materials contained within caulking tubes, a few examples
4 known in the art are:

5 U.S. Patent No. 5,104,013, teaches an adaptor for a
6 caulking tube nozzle that is adjustable for different caulk
7 bead sizes. The adaptor includes a reducing coupling having a
8 large end secured to the caulking tube nozzle and a small end
9 which is threaded. A cap having threads for engagement with
10 the threads of the small end of the coupling engages the
11 reducing coupling to allow different sized beads of caulking to
12 be dispensed. Prior art such as this has demonstrated that
13 thread seals alone are not dependable to prevent caulking from
14 hardening within the tip.

15 US Patent 4,957,225 teaches a replaceable caulking tip for
16 use on the tubular nozzle of a caulking cartridge or the like.
17 The tip includes a tubular body which is internally threaded
18 for replaceable engagement on the nozzle. An outlet orifice is
19 formed at the other end of the body with substantial body
20 material surrounding the orifice to permit shaping of the tip.
21 The tip facilitates application of caulking material in joints
22 and elsewhere while facilitating formation of a smooth bead of
23 caulking material.

24 US Patent 5,894,956 teaches a disposable replacement tip

1 for bypassing solidified material contained in a caulking tube
2 tip. The device includes a conical first end portion tapered
3 acutely to a distal sharpened point. The sharpened point of
4 the first end portion may be driven into the end opening of a
5 caulking tube, or through the sidewall of the caulking tube,
6 and the device is rotated manually to access the unsolidified,
7 flowable material therein.

8 US Patent 4,382,530 teaches an interchangeable nozzle
9 apparatus for a caulking gun that includes a base member which
10 is fittable over the tapered nozzle on a caulking tube and has
11 a universal mounting surface thereon, a plurality of nozzle
12 attachments of different diameters each having a similar
13 mounting portion which mates with the universal base mounting
14 portion, and a securing member such as a thumbscrew for
15 affixing any one of the attachment nozzles to the base member.
16 The nozzle apparatus provides for caulking tube nozzle diameter
17 which is easily changed according to the requirements of a
18 particular project.

19 US Patent 5,833,099 teaches a caulking nozzle removably
20 attachable to a caulking tube. The nozzle includes a hard
21 female insert which includes a flexible elongated tube having
22 an opening for dispensing caulking. The caulking nozzle is
23 useful for the application of caulking material to areas where
24 access is difficult, however it does not provide any means for

1 sealing an open tube.

2 US Patent 4,946,081 teaches a discharge nozzle for a tube
3 of sealant materials which is provided with an aperture or slot
4 that allows the user to monitor the rate of flow of sealant
5 from the tube to assist in the formation of a smooth bead or
6 fillet of sealant material when it is applied through the
7 nozzle to a substrate. The aperture of the nozzle provides
8 controlled resistance to flow which improves discharge and
9 smoothing of materials from the tube.

10 US Patent 5,743,668 teaches an adjustable tip caulking
11 tube including a tapered nozzle having an open inner end and an
12 open outer end. The open inner end has a diameter greater than
13 a diameter of the open outer end. The open inner end couples
14 with an opening in a front end of a caulking tube. A dial
15 couples with the tapered nozzle whereby movement of the dial
16 away from the open outer end will reduce the diameter of the
17 caulking aperture. The tip taught is useful for filling areas
18 of differing widths with caulk.

19 US Patent 2,815,895 teaches a dispensing cap connectable
20 to the neck of a collapsible tube holding a quantity of a
21 glazing compound. The cap is formed with a cylindrical body
22 having an axial end to end bore, one end of which is
23 counterbored and threaded to engage the threads of a neck. An
24 annular sealing gasket seats upon the shoulder defined at the

1 inner end of the counterbore. The dispensing cap of Reed
2 provides a means which will speed up and facilitate the
3 application of a material in a desired, molded cross-sectional
4 shape, usually when installing window glass.

5 US Patents 5,573,281 and 5,462,317 teach an adapter for
6 attachment onto an outlet of a dispensing means such as a
7 mixing device. The device comprises a connecting part for
8 attachment to the outlet of the dispensing means to which other
9 parts can be connected or which can be a specially formed
10 outlet itself. This connecting part comprises a cylindrical or
11 an approximately frusto-conical internal surface part having a
12 self-cutting thread for attachment onto an external surface of
13 the outlet of the mixing device or other dispensing device.
14 Such an adapter can be easily attached to the outlet of a
15 standard static or dynamic mixer or other dispensing device
16 having a stepped external surface, thus eliminating the
17 necessity to keep an inventory of mixers with different outlets
18 or outlet connections.

19 US Patent D335,809 shows an ornamental design for a nozzle
20 for dispensing adhesive, sealants and caulks.

1 SUMMARY OF THE INVENTION

2 The instant invention provides a caulking tube sealing cap
3 which may be threaded onto a standard caulking tube nozzle tip
4 after the tube has been opened. When in operation, the cap of
5 the invention provides airtight sealing, thereby extending the
6 shelf life of the unused caulk remaining in the tube.

7 The cap is preferably a frusto-conically shaped plastic
8 member generally including an internal threaded cavity with a
9 smooth or knurled external gripping surface. A knurled
10 external surface facilitates gripping and rotation of the cap
11 when in operation. The internal threads are preferably tapered
12 to match the external surface of the caulking tube nozzle tip
13 and may be fine or coarse in pitch and may contiguously cover
14 the internal surface of the cavity or they may be segmented.
15 The internal threads of the cap are constructed and arranged to
16 either form or cut threads on the exterior surface of the
17 caulking tube nozzle upon threading onto the tip. The plastic
18 of the cap is of sufficient hardness to allow the internal
19 threaded surface to cut into or form the exterior surface of
20 the caulking tube nozzle, which is generally constructed from
21 a softer plastic than the preferred plastic of the cap. The
22 internal cavity also includes an integrally formed sealing ring
23 constructed and arranged to cooperate with the outer surface of
24 the caulking tube nozzle to prevent air from entering the tube.

1 The sealing ring may comprise, for example, but should not
2 limited to, integrally formed polymeric rings, integrally
3 molded elastomeric rings, O-rings, gaskets or metal ring
4 inserts. The cutting and/or forming action of the internal
5 threads allows the sealing ring to be pulled tightly against
6 the exterior surface of the caulking tube nozzle. In
7 operation, the cap is threaded onto the nozzle of an open tube
8 of caulk until the internal sealing ring contacts the tip
9 seating the sealing ring to prevent air from entering the tube.

10 Accordingly, it is an objective of the instant invention
11 to provide a caulking tube sealing cap capable of providing
12 airtight sealing of opened caulking tubes through a combination
13 of cutting threads and an integrally formed sealing ring which
14 cooperate with a caulking tube nozzle.

15 It is a further objective of the instant invention to
16 provide a caulking tube sealing cap capable of providing
17 airtight sealing of opened caulking tubes through a combination
18 of forming threads and an integrally formed sealing ring which
19 cooperate with a caulking tube nozzle.

20 It is yet a further objective of the instant invention to
21 provide a caulking tube sealing cap which when in use extends
22 the shelf-life of unused caulking remaining in a tube.

23 Other objectives and advantages of the instant invention
24 will become apparent from the following description taken in

1 conjunction with the accompanying drawings wherein are set
2 forth, by way of illustration and example, certain embodiments
3 of the instant invention. The drawings constitute a part of
4 this specification and include exemplary embodiments of the
5 present invention and illustrate various objects and features
6 thereof.

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

1 BRIEF DESCRIPTION OF THE FIGURES

2 Figure 1 is a front view of the instant invention
3 illustrated in cooperation with a caulking tube tip;
4

5 Figure 2 is section view of one embodiment of the instant
6 invention taken along the longitudinal centerline;
7

8 Figure 3 is an end view of the embodiment shown in Figure
9 2 illustrating the continuous helical threads;
10

11 Figure 4 is a side view partially in section illustrating
12 one embodiment of the instant invention in cooperation with a
13 caulking tube tip;
14

15 Figure 5 is a section view of one embodiment of the
16 instant invention taken along the longitudinal centerline;
17

18 Figure 6 is an end view of the embodiment shown in Figure
19 5 illustrating segmented helical threads;
20

21 Figure 7 is a side view partially in section illustrating
22 one embodiment of the instant invention in cooperation with a
23 caulking tube tip;
24

Figure 8 is a side view partially in section illustrating one embodiment of the instant invention in cooperation with a caulking tube tip.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

1 DETAILED DESCRIPTION OF THE INVENTION

2 For the purposes of promoting an understanding of the
3 principles of the invention, reference will now be made to the
4 embodiment illustrated in the drawings and specific language
5 will be used to describe the same. It will nevertheless be
6 understood that no limitation of the scope of the invention is
7 thereby intended, such alterations and further modifications in
8 the illustrated device, and such further applications of the
9 principles of the invention as illustrated therein being
10 contemplated as would normally occur to one skilled in the art
11 to which the invention relates.

12 Referring to Figures 1-4 of the instant invention, it can
13 be seen that a sealing cap 100 capable of sealing air out of an
14 open caulking tube is shown. The sealing cap includes a body
15 member 10 having a solid top portion 12 and a depending annular
16 wall 14 forming an inner cavity 16, the top portion and the
17 annular wall having a common outer surface 18. The inner
18 cavity 16 includes a caulking tube engagement means illustrated
19 herein as continuous helical threads 20. The continuous
20 helical threads which cooperate with a caulking tube tip 22 are
21 constructed and arranged to form threads on the outer surface
22 of the caulking tube tip 22. The threads of the preferred
23 embodiment are tapered to conjugately match the outer tapered
24 surface 24 of the caulking tube tip 22. The inner cavity 16

1 also includes a sealing means illustrated herein as an
2 integrally formed sealing ring 26. The sealing ring is
3 constructed and arranged to compressively engage the outer
4 surface 24 of the caulking tube tip 22. The cooperation
5 between the sealing cap and the caulking tube tip provide
6 compressive engagement with the sealing means to prevent air
7 from entering the caulking tube 25. In this manner air is
8 prevented from entering a previously opened caulking tube 25
9 thereby preserving the unused contents for future use. The
10 outer surface 18 includes a gripping means constructed and
11 arranged to provide gripping for rotational engagement between
12 said caulking tube tip and the sealing cap. The gripping means
13 of the preferred embodiment is illustrated herein as integrally
14 formed knurling 28. Knurling is well known in the art and may
15 include, but should not be limited to, straight knurling,
16 diagonal knurling and/or diamond knurling and the like.

17 Referring to Figures 5 and 6, an alternative embodiment of
18 the instant invention is illustrated. In this embodiment the
19 internal threads 30 are constructed as segments 33. Each of
20 the segments includes a cutting edge 34 constructed and
21 arranged to at least partially cut threads on the outer surface
22 of the caulking tube tip. Between each of the segments is a
23 flute 32. The flute is adapted to channel and/or hold any
24 debris or caulking loosened from the outer surface of the

1 nozzle tip during the thread cutting. The flutes 32 may be
2 straight such as those shown or alternatively may be angled or
3 helical as is well known in the art.

4 In an alternative embodiment (not shown) the threads may
5 include multiple leads to facilitate full engagement of the
6 sealing cap with fewer rotations when compared to single lead
7 threads.

8 Referring to Figure 7, an alternative embodiment of the
9 instant invention is illustrated having an O-ring 36. The O-
10 ring is supported within a standard O-ring groove 38 formed
11 within the depending wall 14 and facing the inner cavity 16.
12 The construction of the O-ring and groove cooperate with the
13 caulking tube tip outer surface 24 to prevent air from entering
14 a previously opened caulking tube 25, thereby preserving the
15 unused contents for future use. The O-rings are preferably
16 constructed from materials well known in the art which may
17 include, but should not be limited to, Cork, Gasket Material,
18 Leather, Rubber, Buna-N, Silicone, Neoprene,
19 Tetraflouroethylene, Viton or suitable combinations thereof.

20 Referring to Figure 8, a further alternative embodiment of
21 the sealing cap 10 is illustrated wherein the sealing means
22 includes an elastomeric ring 40 or metal ring (not shown)
23 integrally molded into the depending wall 14 within the cavity
24 of the sealing cap.

1 As will be appreciated by those skilled in the art from a
2 study of the figures and the above description, the sealing cap
3 100 is formed primarily from molded components. In a present
4 form, the sealing cap 100 is preferably formed primarily from
5 polymeric material using an injection molding process. Those
6 skilled in the art will recognize that there are various other
7 materials and processes that can be used to manufacture the
8 sealing cap 100 and its components, these other materials and
9 process have been contemplated and may be substituted without
10 departing from the scope of the present invention.

11 All patents and publications mentioned in this
12 specification are indicative of the levels of those skilled in
13 the art to which the invention pertains. All patents and
14 publications are herein incorporated by reference to the same
15 extent as if each individual publication was specifically and
16 individually indicated to be incorporated by reference.

17 It is to be understood that while a certain form of the
18 invention is illustrated, it is not to be limited to the
19 specific form or arrangement herein described and shown. It
20 will be apparent to those skilled in the art that various
21 changes may be made without departing from the scope of the
22 invention and the invention is not to be considered limited to
23 what is shown and described in the specification.

24 One skilled in the art will readily appreciate that the

1 present invention is well adapted to carry out the objectives
2 and obtain the ends and advantages mentioned, as well as those
3 inherent therein. The embodiments, methods, procedures and
4 techniques described herein are presently representative of the
5 preferred embodiments, are intended to be exemplary and are not
6 intended as limitations on the scope. Changes therein and other
7 uses will occur to those skilled in the art which are
8 encompassed within the spirit of the invention and are defined
9 by the scope of the appended claims. Although the invention
10 has been described in connection with specific preferred
11 embodiments, it should be understood that the invention as
12 claimed should not be unduly limited to such specific
13 embodiments. Indeed, various modifications of the described
14 modes for carrying out the invention which are obvious to those
15 skilled in the art are intended to be within the scope of the
16 following claims.